REMARKS

Applicants respectfully requests reconsideration of the present application.

CLAIMS STATUS

Applicants have amended claims 1 and 2 to present the claimed subject matter more clearly. Support for the amendment may be found throughout the specification as filed and, in particular, in Figures 1b, 2, 3 and page 34, lines 4-10. No new matter has been added.

After the amendment, pending claims include examined claims 1-18 and withdrawn claims 19-83.

CLAIM REJECTIONS UNDER 35 U.S.C. § 103(a)

Claims 1-9 and 13-18 stand rejected as obvious in view of Westervelt (U.S. Patent no. 5,663,507) and Nguyen (U.S. Patent no. 5,976,994). Applicants respectfully traverse.

Westervelt does not teach and does not provide an enabling disclosure for at least the following four underlined elements that are each required by claim 1:

1) a doubly clamped, suspended beam with a submicron width defined between a first side and a second side of the beam;

2) a doubly clamped, suspended beam having an asymmetrically positioned, mechanical-to-electrical transducing layer fabricated asymmetrically within a thickness of the beam or on the beam;

3) at least one side drive gate;

4) at least one side drive gate located within a submicron distance to the first or the second side of the beam.

Nguyen does not cure any of the above identified deficiencies of Westervelt. Applicants provide a more detailed explanation of their position below.

ELEMENT 1

Applicants submit that Westervelt does not teach or does not provide an enabling disclosure for a doubly clamped, suspended beam with a submicron width. With respect to the submicron width of the beam, the Office Action on page 2 refers to the following places of Westervelt: a) col. 3, lines 21-22, b) column 5, lines 17-18, c) column 7, lines 34-36 and d) column 7, line 40. In col. 3, lines 21-22 Westervelt mentions "a GaAs/AlGaAs heterostructure, with dimensions on the micron and submicron levels"; in col. 5, lines 17-18, Westervelt states that "other ... dimensions can be determined by those skilled in the art based upon the teachings advanced herein"; in col. 7, lines 36-40, Westervelt asserts that the expressions in column 7, lines 27-28 and 33 "show that force sensitivity increases for small sizes; further, in column 7, lines 35-40, Westervelt states that his "strain sensing FETs ... can ... be used to fabricate and sense the forces within cantilevers and electromechanical structures having sizes much smaller than those currently in use, going all the way to the submicron region."

Applicants submit that although Westervelt mentions dimensions or sizes of submicron size, nowhere in his disclosure Westervelt specifies explicitly that a submicron size or dimension is a width of a double clamped, suspended beam.

Furthermore, should one try to interpret Westervelt's vague statements about dimensions or sizes of submicron levels based on Westervelt's example in column 4, line 43, through column 5, line 67, and Figures 1-2, one would not have concluded that a width of Westevelt's heterostructure or cantilever **12** has a submicron dimension. Westervelt specifies a width **20** of his channel **14** as "of the order of 5 microns", see col. 5, lines 10-11, while the width of Westevelt's heterostructure or cantilever **12** is greater than the width **20** of Westervelt's channel **14**. Applicants further submit that nowhere in his disclosure does Westervelt teach how to make heterostructures or cantilevers with a submicron width.

In addition, Applicants submit that, even if one of ordinary skill art would interpret Westervelt statements in column 7, lines 34-40, as indirectly referring to a width with a size in a submicron region, based on a reference in column 7, line 34, to the expression in column 7, line 27-28, which contains a width in a denominator, Westervelt's disclosure would still remained not-enabling with respect to a submicron width in view of Westervelt's own

statement that sizes in the submicron region are "much smaller than those currently in use," column 7, line 38-39.

Applicant respectfully submit Nguyen does not cure Westervelt's deficiency with respect to the submicron width of the doubly clamped, suspended beam required by the present claims. In particular, Applicants submit that Nguyen cannot serve as evidence demonstrating that Westervelt enables making a beam with a submicron width.

In sum, Applicants submit that no *prima facie* obviousness is established, because, a combination of Westervelt and Nguyen does not teach all the elements of the claimed invention, including element 1. Accordingly, Applicants request withdrawal of the rejection.

ELEMENT 2

Applicants respectfully submit that a doubly clamped, suspended beam having an asymmetrically positioned, mechanical-to-electrical transducing layer fabricated asymmetrically within a thickness of the beam or on the beam is not taught or suggested by the applied prior art. On page 2, the Office Action asserts that Westervelt's element **13**, which is a field effect transistor region (col. 5, lines 4-5), positioned in Westervelt's element **12**, which is referred to as a heterostructure or cantilever (col. 5, lines 5 and 13), represents an asymmetrically positioned, mechanical-to-electrical transducing layer fabricated within the beam or on the beam of the original claim 1. Applicants respectfully submit that the PTO did not interpret the term "asymmetrically positioned" according to the specification. Applicants refer the PTO to Figure 1B and page 34, lines 4-6, which provide a guidance with respect to the term "asymmetrically positioned". In particular, the specification explains that layer 18 in Figure 1b "is not in the center of the stack 10, but is fabricated to lie to one side of stack 10". Applicants also amended claim 1 to further elucidate the term "asymmetrically positioned" as explained in the specification. Applicants invite the Examiner to contact the undersigned Applicants' representative if he has helpful suggestions that would help to avoid the misinterpretations of the term "asymmetrically positioned".

Applicants submit that Nguyen does not cure the discussed above deficiency of Westervelt. Furthermore, Nguyen does not provide any suggestion or motivation to modify

Westervelt device to arrive at a doubly clamped, suspended beam having an asymmetrically positioned, mechanical-to-electrical transducing layer fabricated asymmetrically within a thickness of the beam or on the beam required by claim 1.

Applicants further refer the PTO to page 34, lines 6-8, and page 40, lines 3-6, of the specification as filed for discussion of advantages of using the asymmetrically positioned mechanical-to-electrical transducing layer in the suspended beam.

In sum, no *prima facie* obviousness is established, because a combination of Westervelt and Nguyen does not teach all the elements of the claimed invention, including element 2. Accordingly, Applicants request withdrawal of the rejection.

ELEMENT 3

Westervelt does not teach at least one side drive gate required by claim 1. The Office Action, on page 2, explicitly admits this Westervelt's deficiency by stating "Westervelt differs from the claimed invention ... in not disclosing a side gate". To remedy the admitted deficiency of Westervelt, the PTO relies on Nguyen. In particular, the Office Action, in the top paragraph on page 3, the PTO asserts that a) Nguyen discloses an apparatus analogous to the Westervelt's one and b) Nguyen's element 16 is "at least one side drive gate".

Applicants respectfully submit that Nguyen's microresonator and Westervelt's Field Effect Transistor based apparatus have different principle of operation and thus cannot be considered analogous devices contrary to the PTO's assertion. Applicants further submit that Nguyen's element 16 is not a side drive gate as asserted by the PTO, but a drive electrode of microresonator.

Westervelt's device is a strain-measuring transducer that has a Field Effect Transistor region, including a semiconducting channel and a gate, which is etched onto a base of a beam or cantilever arm, see column 2, lines 49-56. According to Westervelt, a Field Effect Transistor (FET) is generally known to be a voltage controlled device, in which a current conduction between a source region and a drain region through a channel region is controlled or modulated by means of a control voltage applied to a gate terminal, see column 2, lines 25-

30. Westervelt's strain-measuring transducer measures changes in a electrical conductivity of the channel of the FET region caused by a piezoelectrical effect generated by the strain, column 2, line 67, through column 3, line 2. The gate electrode in Westervelt's device is used to modulate a current conduction through the channel region between the drain and the source electrodes as in other FET devices, see e.g. Figure 4.

Unlike Westervelt's strain measuring transducer, Nguyen's device is not a FET based device because Nguyen device does not have a) a channel region formed between a drain region and a source region and b) a gate electrode that modulates or controls a current conduction through the channel region. Applicants respectfully submit that Nguyen's electrodes 10 in Figure 1 are not FET's source and drain region and that Nguyen's electrode 16 does not modulate or control a current conduction between the electrodes 10.

Instead, Nguyen's device is a micromechanical resonator. As Nguyen explains in column 5, lines 22-32, a principle of operation of a micromechanical resonator is as follows:

a) an AC drive signal is first applied to a drive electrode, such as Nguyen's elements 14 or 38, to induce vibration of a beam or resonator, such as Nguyen's element 14 or 30;

b) once the vibration is established, an output current is generated via a DC-biased, time varying capacitor an output or sensing electrode, such as Nguyen's elements 18 or 32;

c) this current is then sensed.

Thus, Nguyen's electrode 18 is not a side driving gate.

Concluding their remarks with respect to element 3, Applicants submit that no *prima facie* obviousness is established for the following two reasons:

i) a combination of Westervelt and Nguyen does not teach all the elements of the claimed invention, because neither Westervelt, nor Nguyen teaches a side drive gate;

ii) one of ordinary skill in the art would not have a required motivation and a required reasonable expectation of success to combine Westervelt and Nguyen as suggested by the PTO, because an introduction of Nguyen's drive electrode into Westervelt's FET based

device either would have changed a principle of Westervelt's device's operation or would have made Westervelt's device unoperable.

Thus, Applicants request withdrawal of the rejection.

ELEMENT 4

Westervelt does not teach at least one side drive gate located within a submicron distance to the first or the second side of the beam.

With respect to this element, the PTO relies on Nguyen's Figure 1, which, as the PTO asserts, shows that Nguyen's element 16 is proximate to a beam within a distance smaller than a width of the beam.

Applicants respectfully submit that drawings in patent applications are usually not scaled and nowhere in the text does Nguyen explicitly state that element 16 is located to a beam within a distance smaller than a width of the beam. Thus, Applicants' position is that Nguyen does not teach that element 16 is proximate to a beam within a distance smaller than a width of the beam.

Furthermore, as Applicants explained in their comments with respect to Element 1, Westervelt does not teach or does not provide an enabling disclosure for a doubly clamped, suspended beam with a submicron width. Thus, even if, for the argument's sake, Nguyen was teaching that element 16 is proximate to a beam within a distance smaller than a width of the beam, a combination of Westervelt and Nguyen would still be deficient with respect to a side gate located within a submicron distance to the first or the second side of the beam.

In sum, Applicants submit that Westervelt and Nguyen does not teach all the elements of the claimed invention, because Westervelt and Nguyen do not teach a side gate located within a submicron distance to the first or the second side of the beam. Accordingly, Applicants request withdrawal of the rejection.

The PTO's back-up position with respect to a side gate located within a submicron distance to the first or the second side of the beam is that one "of ordinary skill in the relevant

art would, of necessity, understand that drive and sense gates operate by capacitance and that capacitance is increased with decreasing proximity of capacitance plates."

Applicants submit that Nguyen does not teach drive and sense gates. Instead, Nguyen teaches drive and sense electrodes. Applicants respectfully submit if one out of necessity would have understood that Nguyen's drive and sense electrodes operate by capacitance, he would have not have a required motivation and a required reasonable expectation of success to introduce Nguyen's drive electrode into Westervelt's FET based device to arrive at the claimed invention because such an introduction would have changed a principle of operation of Westervelt's device.

In sum, because no *prima facie* obviousness is established, Applicants request withdrawal of the rejection.

Claims 10-12 stand rejected as obvious in view of Westervelt and Nguyen and further in view of Blick (Phys. Rev. B, Vol. 62, pg. 17103).

Applicants discussed deficiencies of a combination of Westervelt and Nguyen. Blick does not cure the deficiencies of Westervelt and Nguyen. Accordingly, because no *prima facie* obviousness is established, Applicants request withdrawal of the rejection.

CONCLUSION

Applicants believe that the present application is in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested. The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check or credit card payment form being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are

needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

Date February 12, 2008 By _____

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